

FIG. 1a

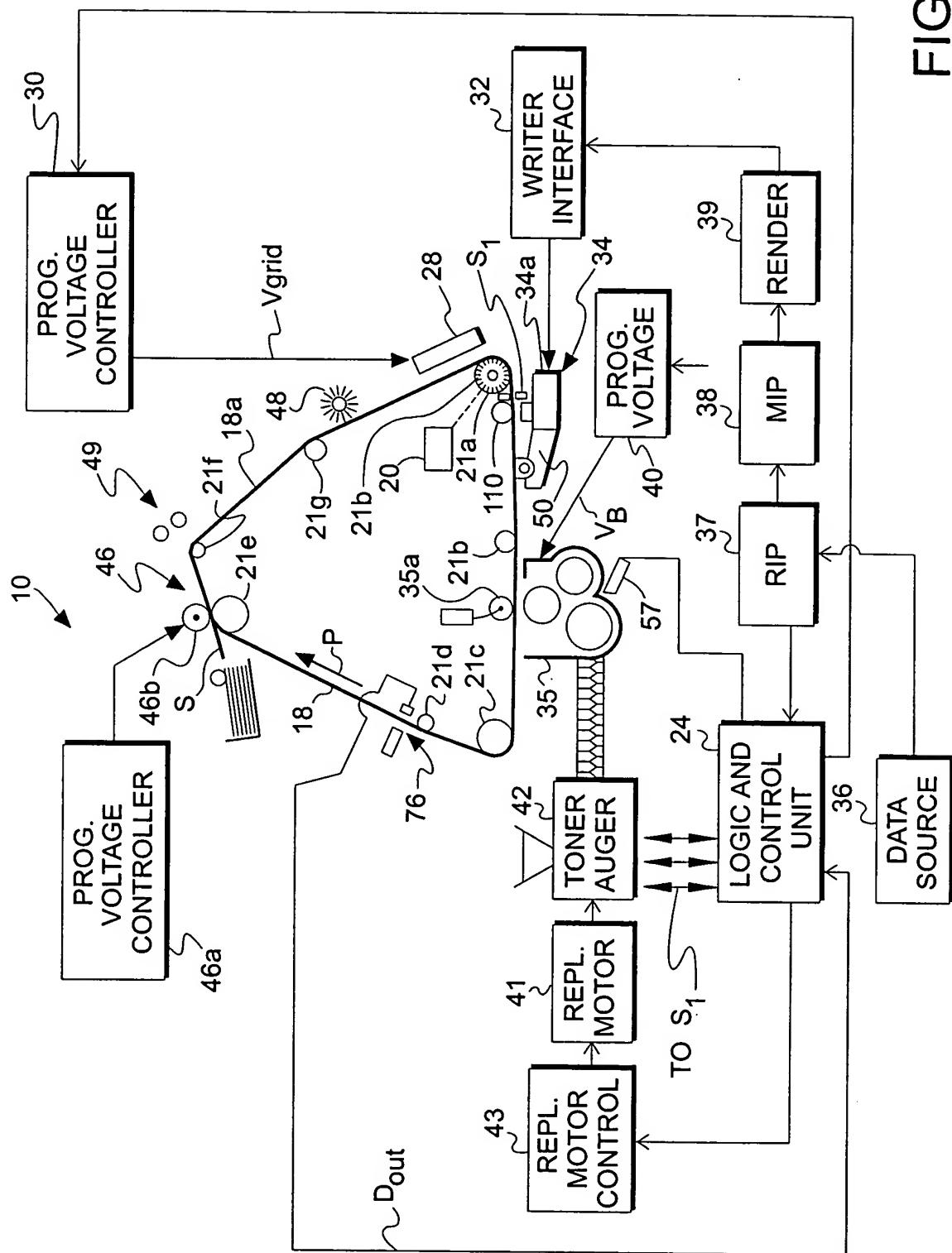
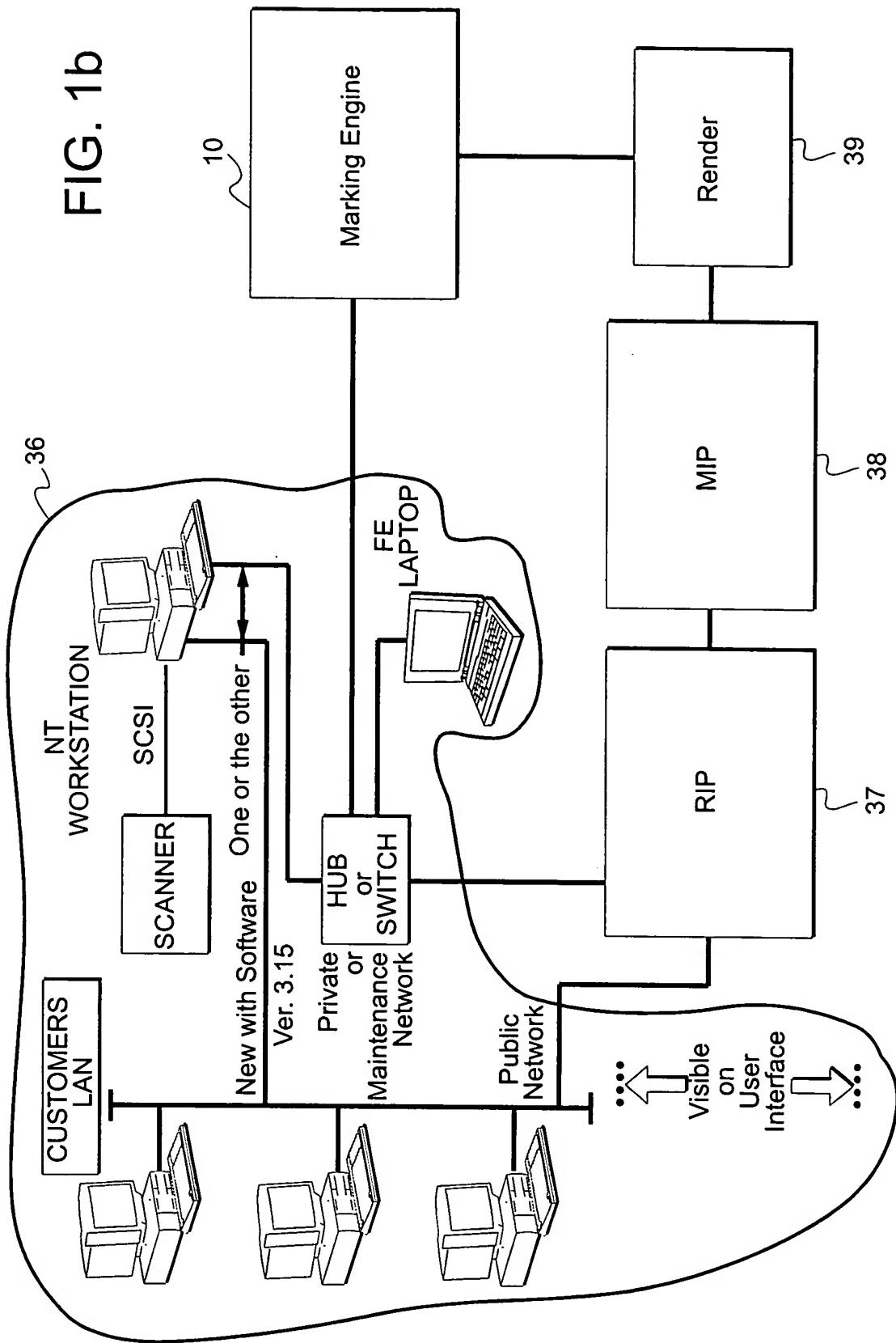


FIG. 1b



Algorithm Block Diagram

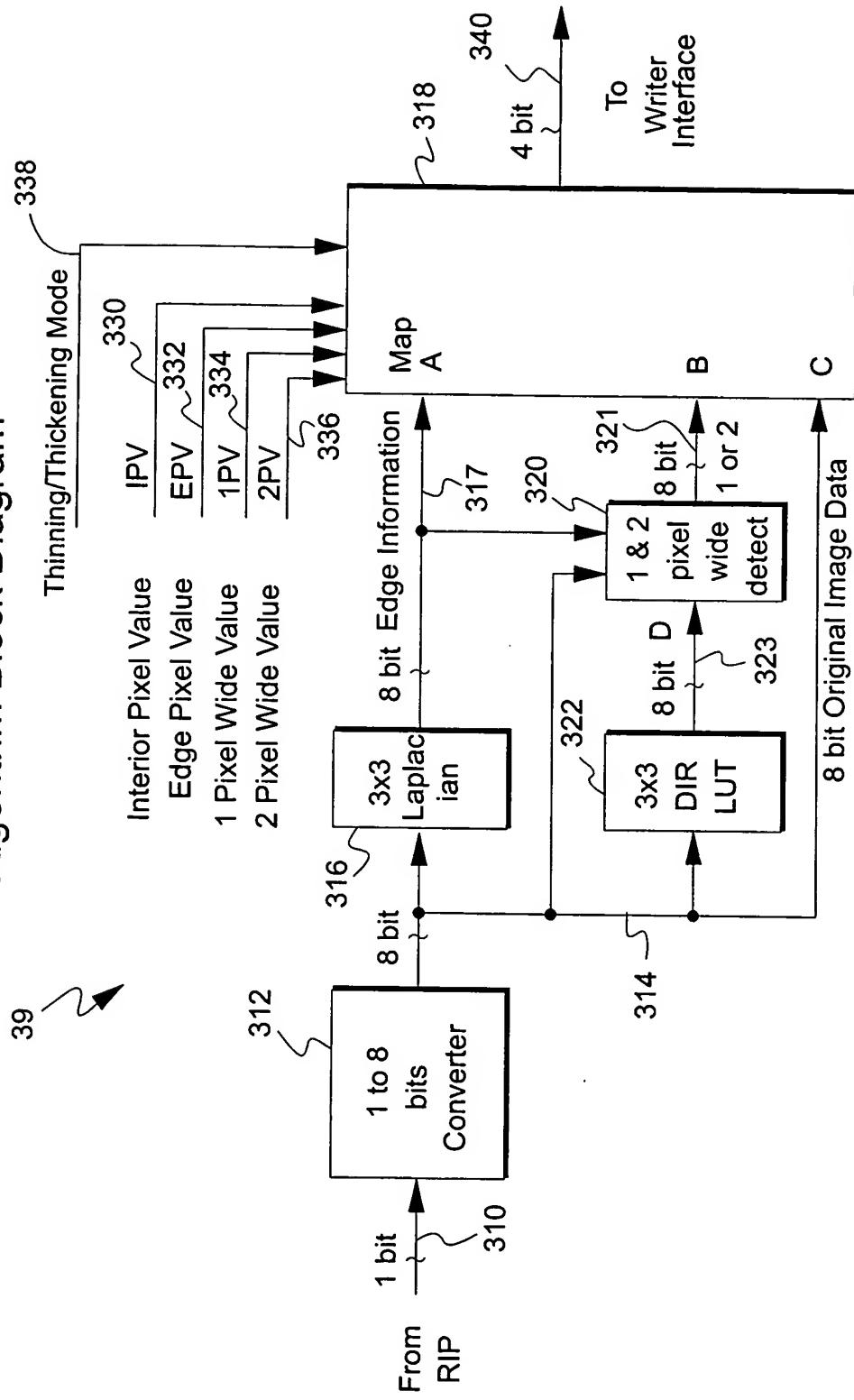


FIG. 2

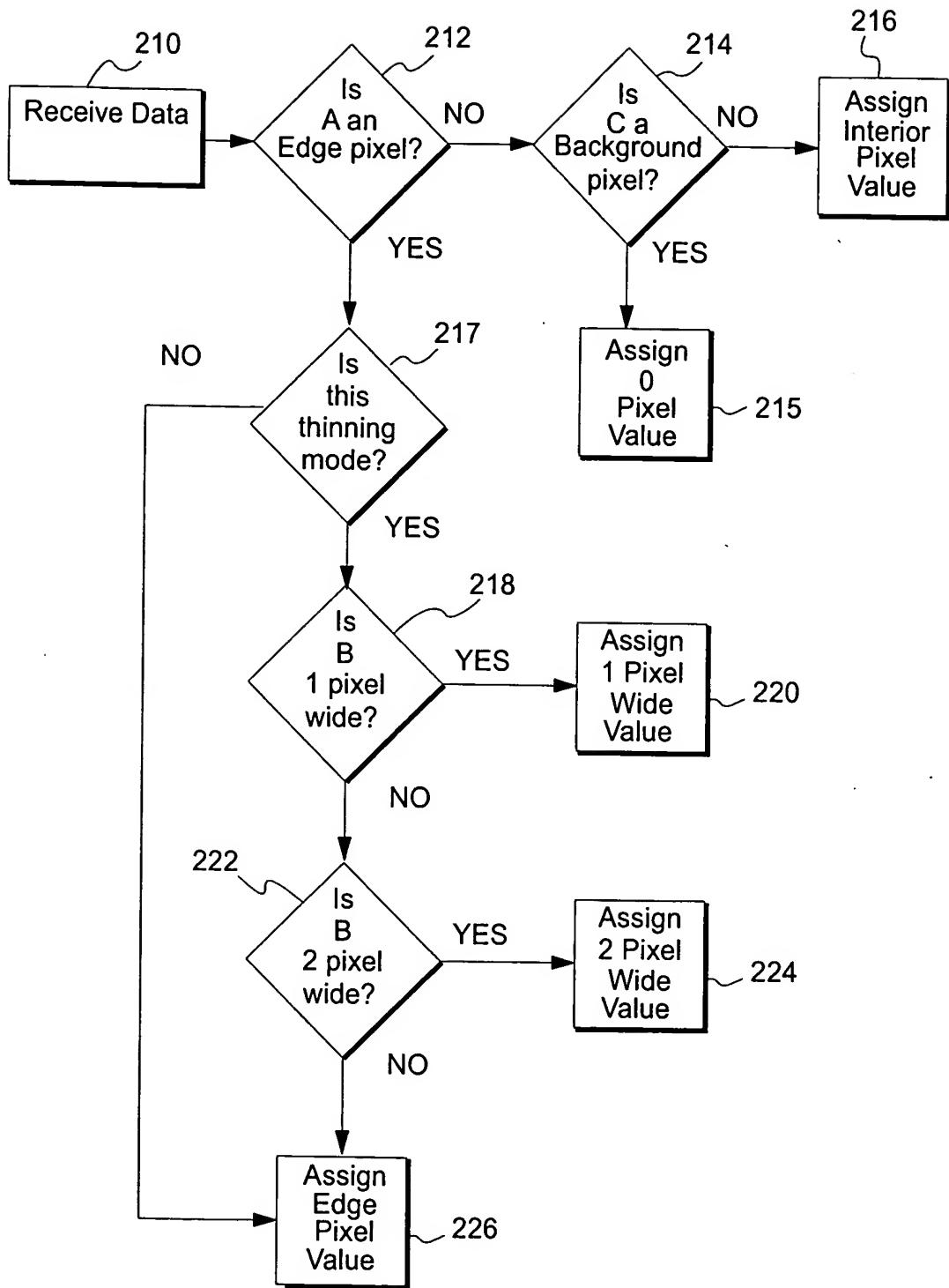


FIG. 3

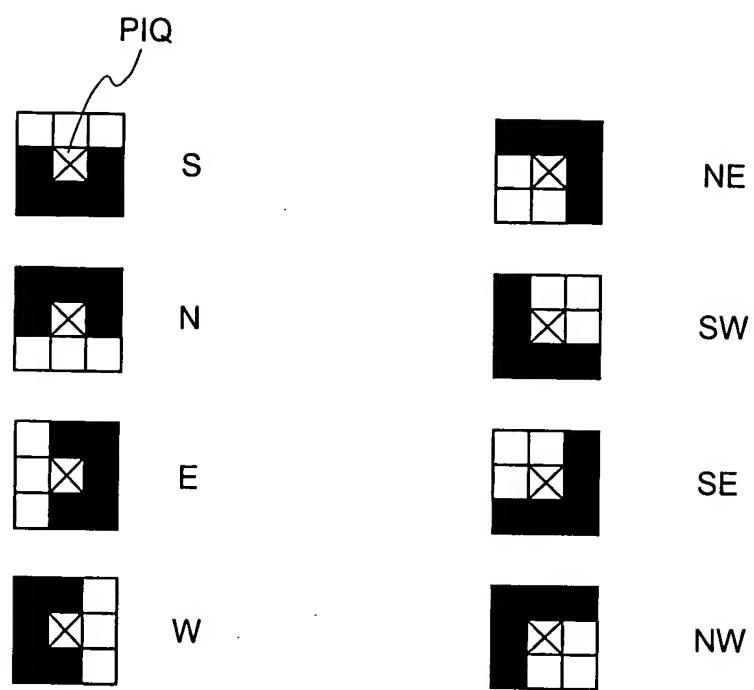


FIG. 4

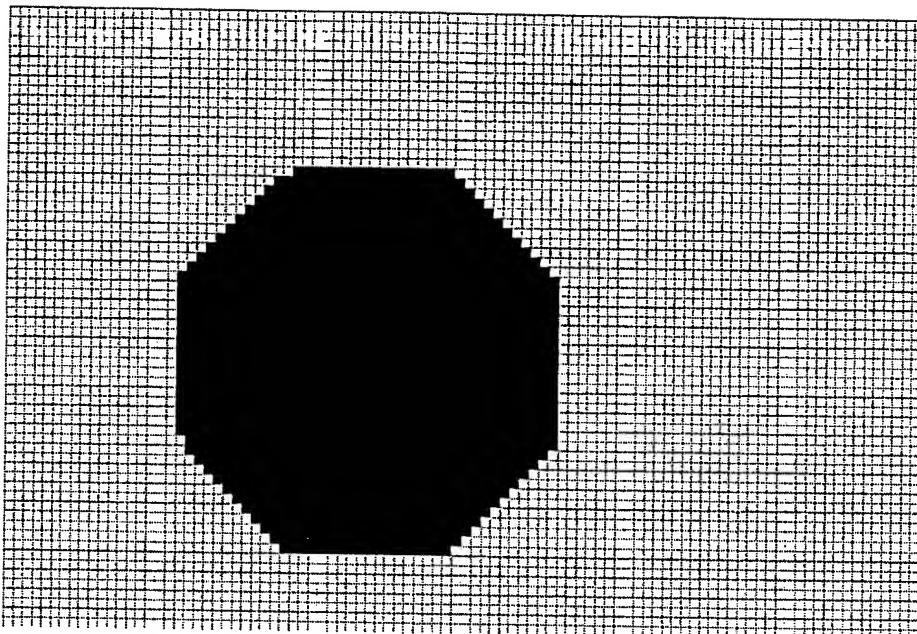


Fig. 5a
Original object bitmap

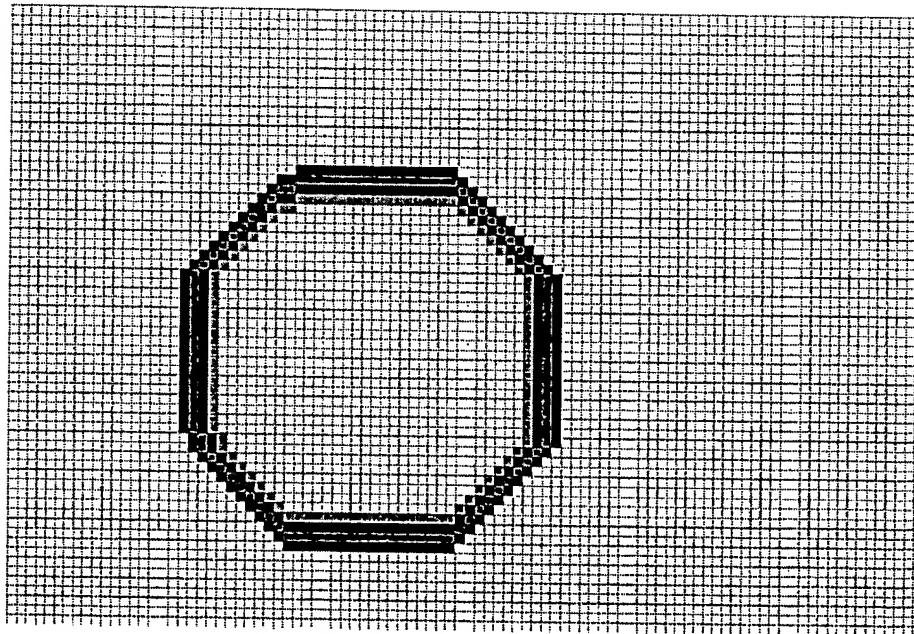


Fig. 5b
Four onion skin layers
when thinning

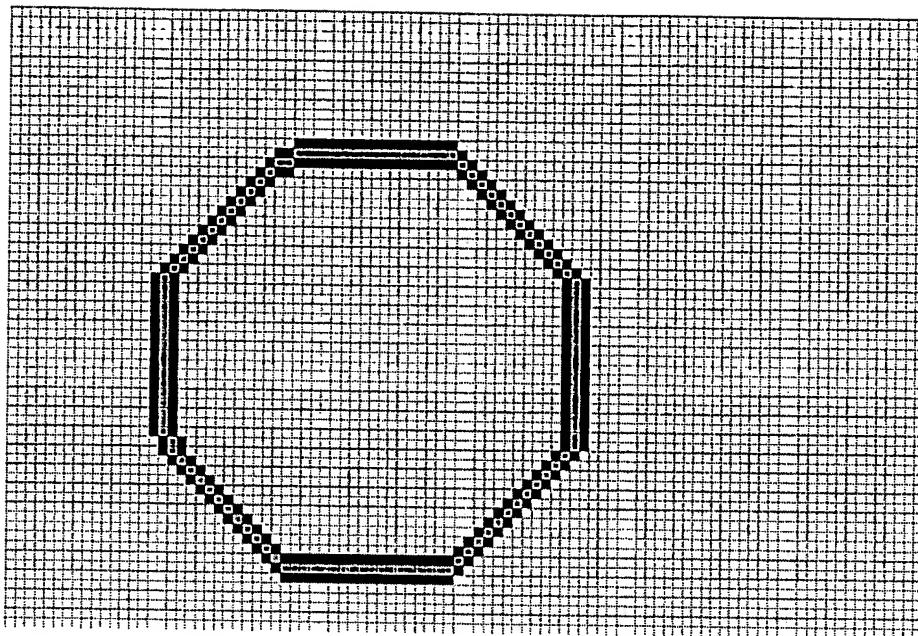


Figure 5c

Three onion skin layers
when thickening

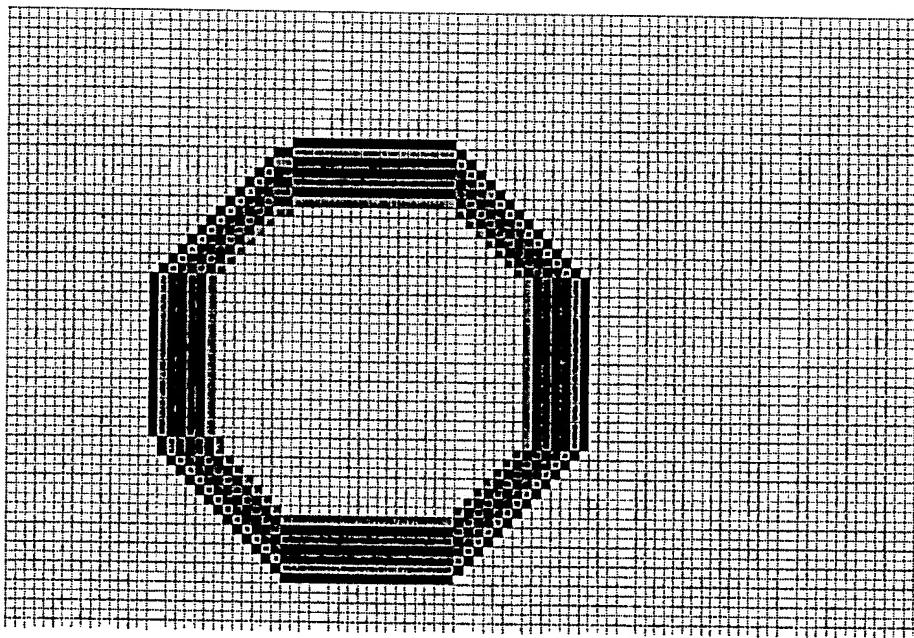


Fig. 5d

All layers
(thickening and thinning)

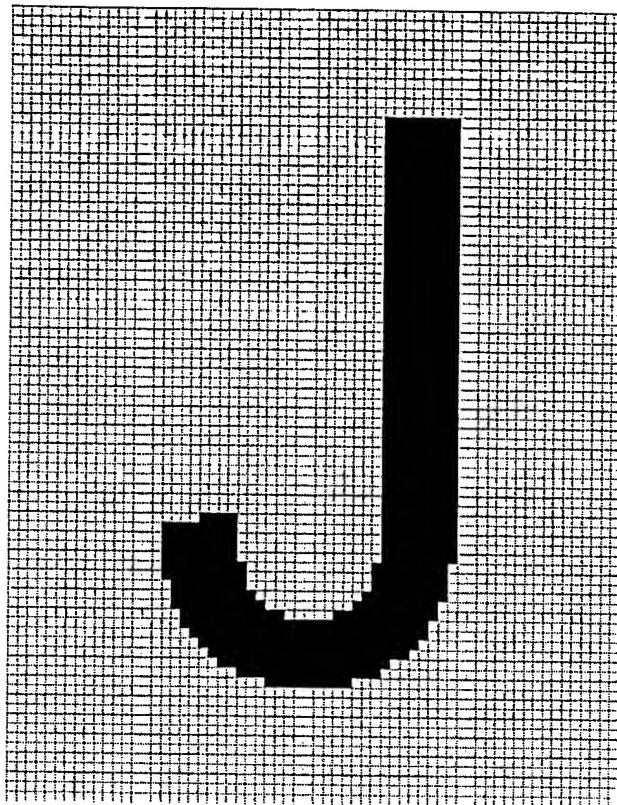


Fig. 6a
Original

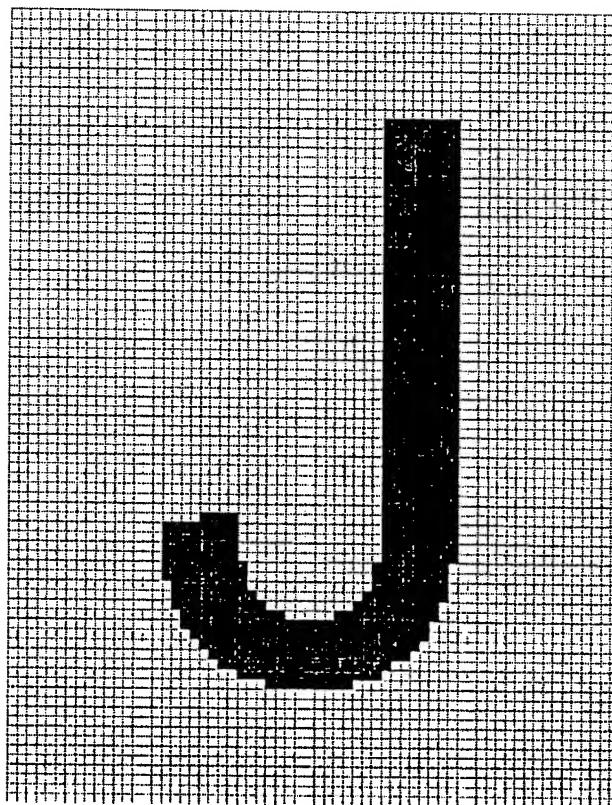


Fig. 6b
Same grey pixel value
assigned to edges and
solid area density

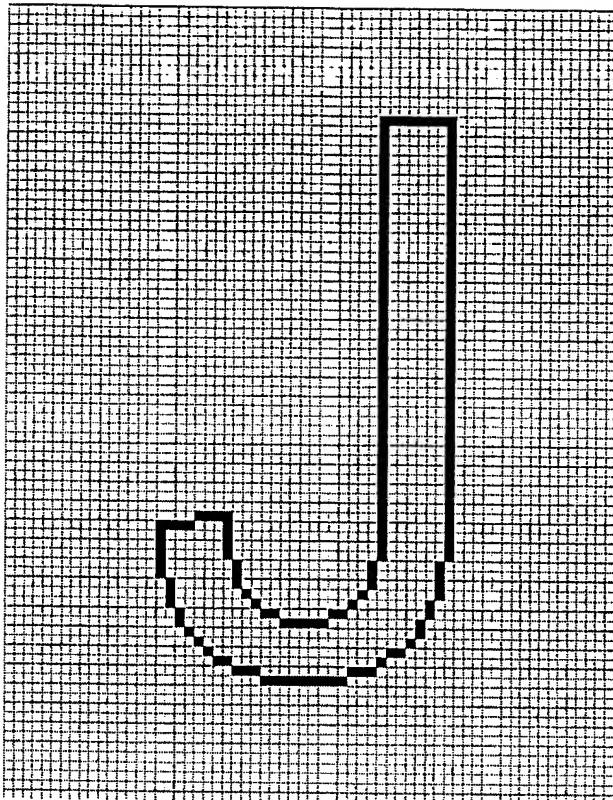


Fig. 6c
Edges when
thinning

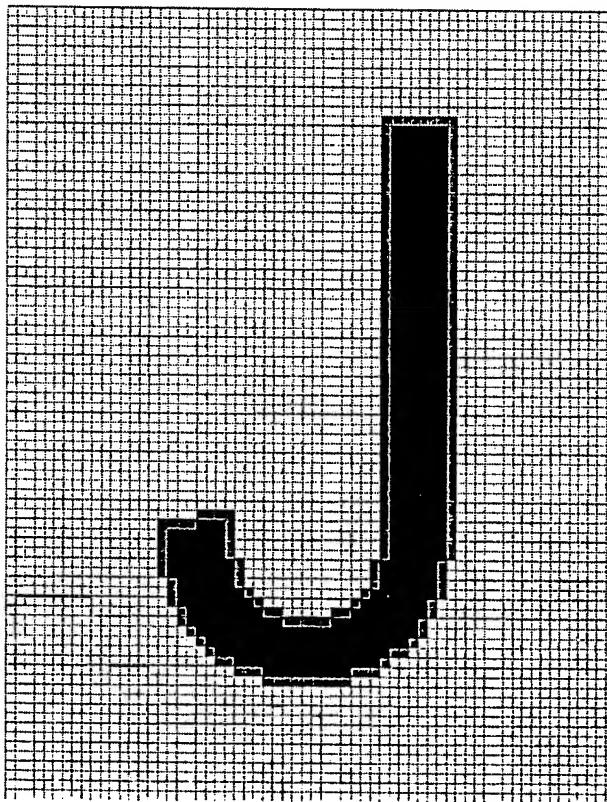


Fig. 6d
Lightened -
Solid area density reduced
Letter thinner

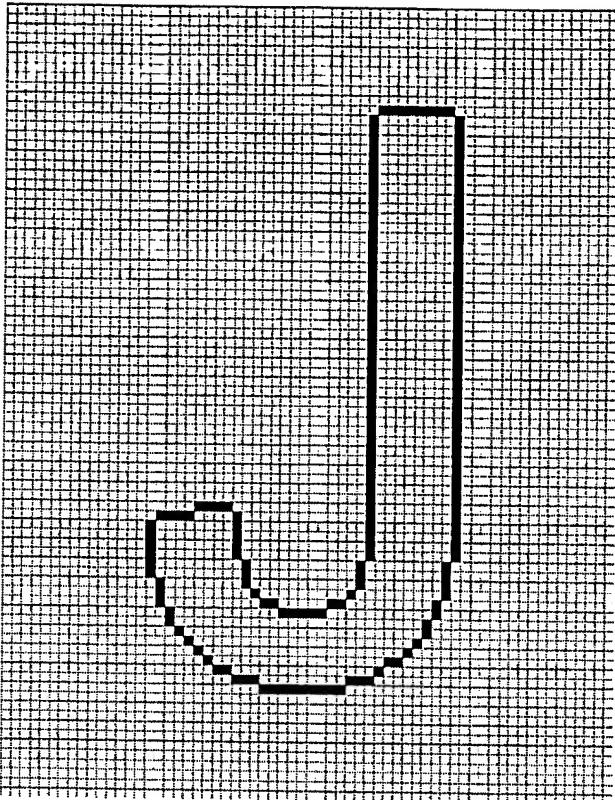


Fig. 6e
Edges when
thickening

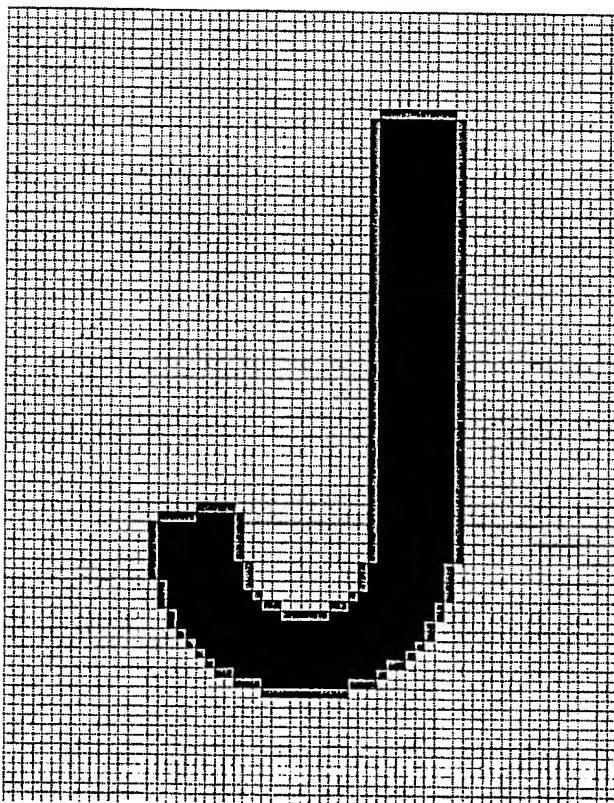
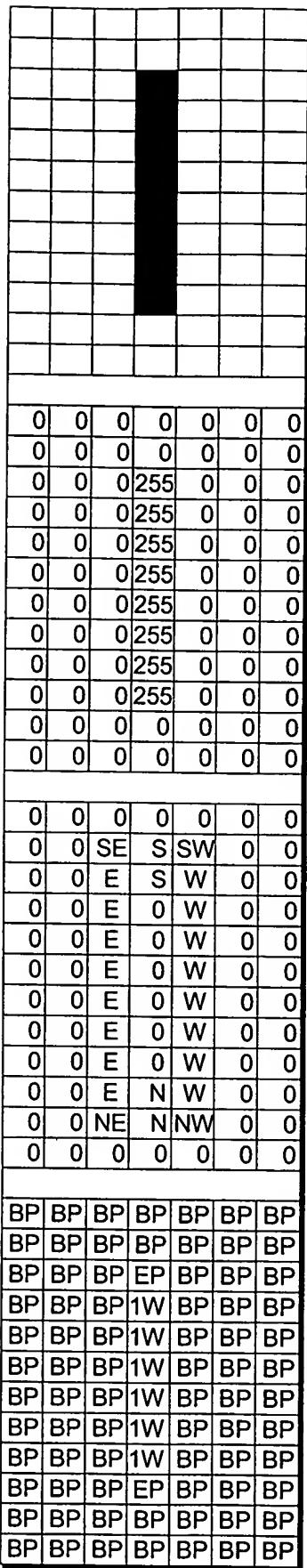


Fig. 6f
Thickened
Letter thickened by
applying grey edges which
were originally white



1 Pixel Wide Detection

Original 1 pixel wide line

FIG. 7a

Edge Pixels

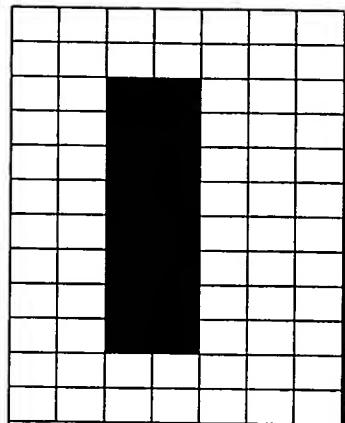
FIG. 7b

Direction Values

FIG. 7c

Assignment
BP: Background Pixel
EP: Edge Pixel
1W: One Pixel Wide Line

FIG. 7d



2 Pixel Wide Detection

Original 2 pixel wide line

FIG. 8a

0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	255	255	0	0	0
0	0	255	255	0	0	0
0	0	255	255	0	0	0
0	0	255	255	0	0	0
0	0	255	255	0	0	0
0	0	255	255	0	0	0
0	0	255	255	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Edge Pixels

FIG. 8b

0	0	0	0	0	0	0
0	SE	S	S	SW	0	0
0	E	SE	SW	W	0	0
0	E	E	W	W	0	0
0	E	E	W	W	0	0
0	E	E	W	W	0	0
0	E	E	W	W	0	0
0	E	E	W	W	0	0
0	E	NE	NW	W	0	0
0	NE	N	N	NW	0	0
0	0	0	0	0	0	0

Direction Values

FIG. 8c

BP						
BP						
BP	BP	EP	EP	BP	BP	BP
BP	BP	2W	2W	BP	BP	BP
BP	BP	2W	2W	BP	BP	BP
BP	BP	2W	2W	BP	BP	BP
BP	BP	2W	2W	BP	BP	BP
BP	BP	2W	2W	BP	BP	BP
BP	BP	2W	2W	BP	BP	BP
BP	BP	2W	2W	BP	BP	BP
BP	BP	EP	EP	BP	BP	BP
BP						
BP						

Assignment

BP: Background Pixel

EP: Edge Pixel

2W: Two Pixel Wide Line

FIG. 8d

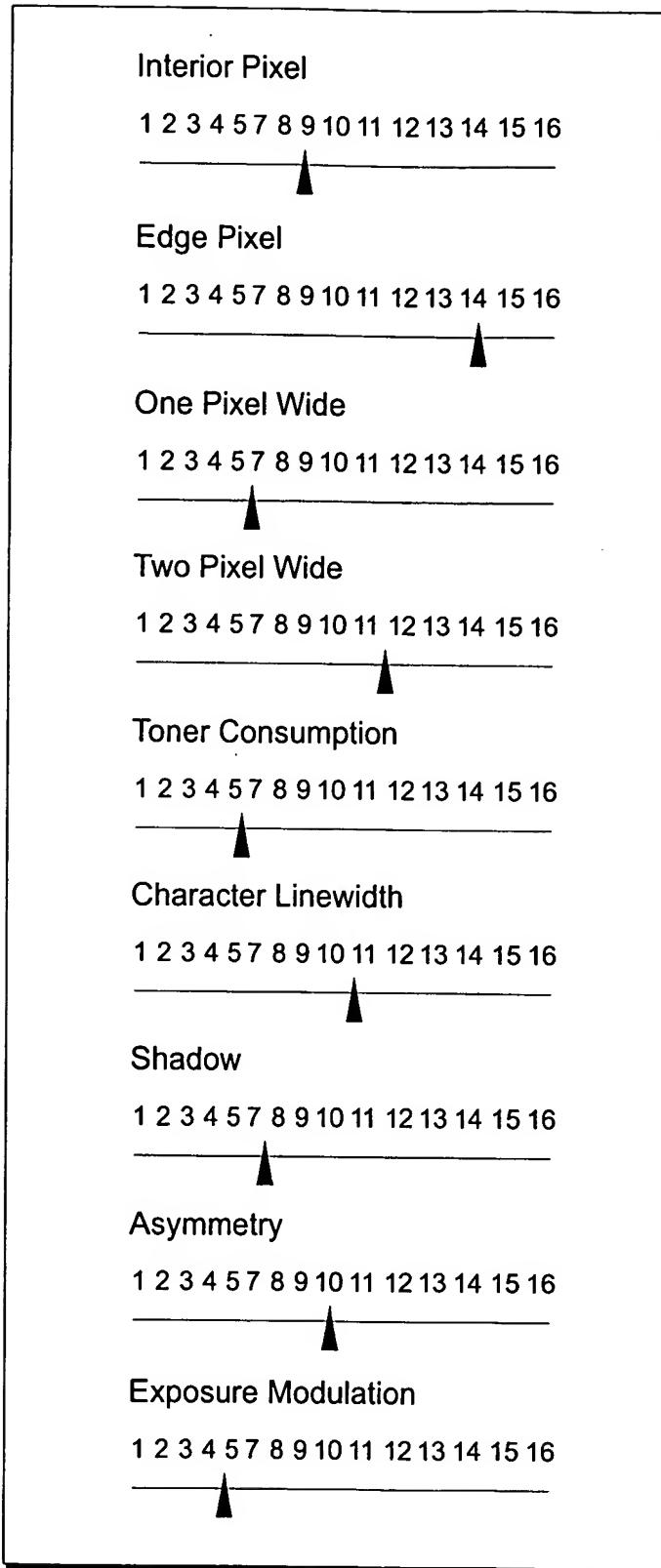


FIG. 9

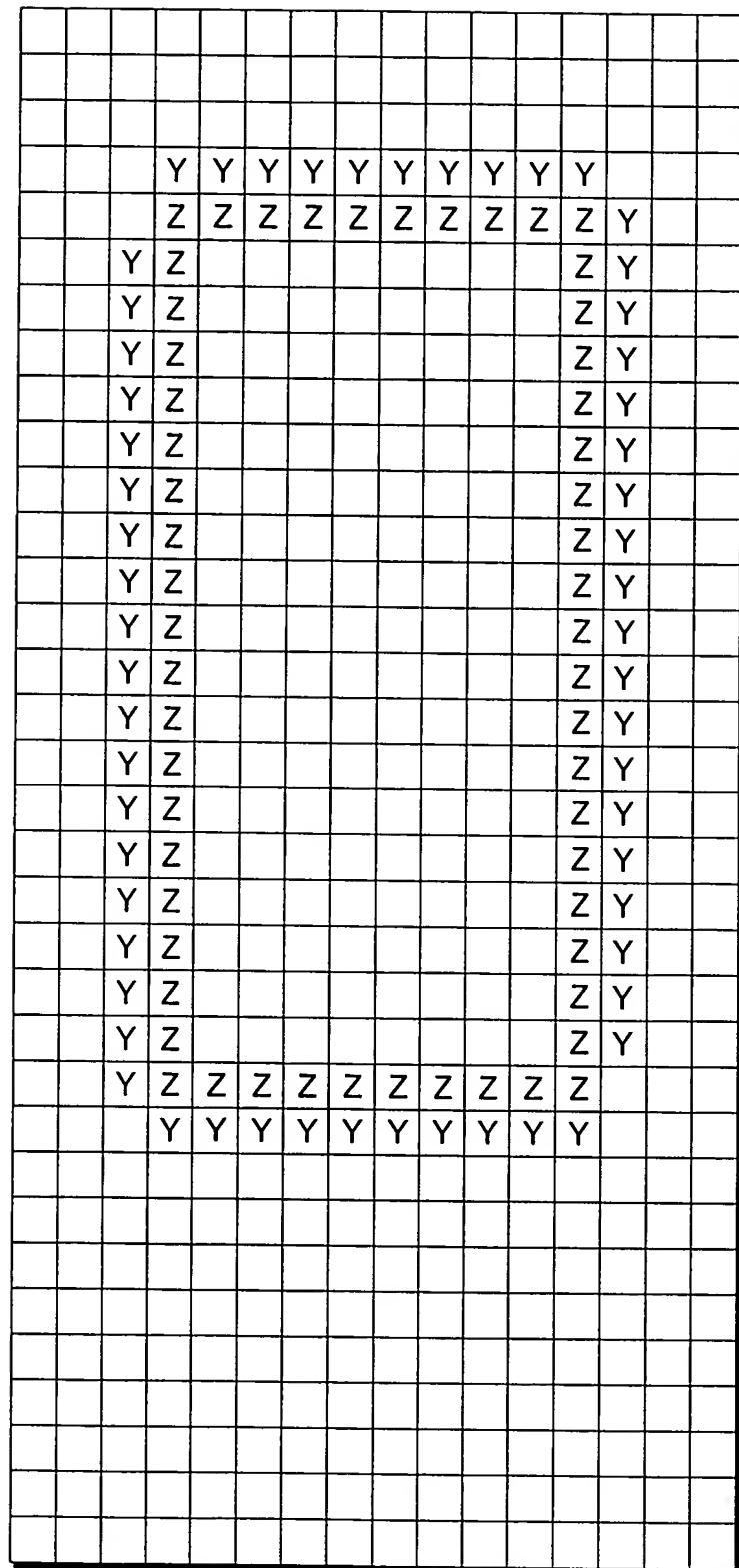


FIG. 10

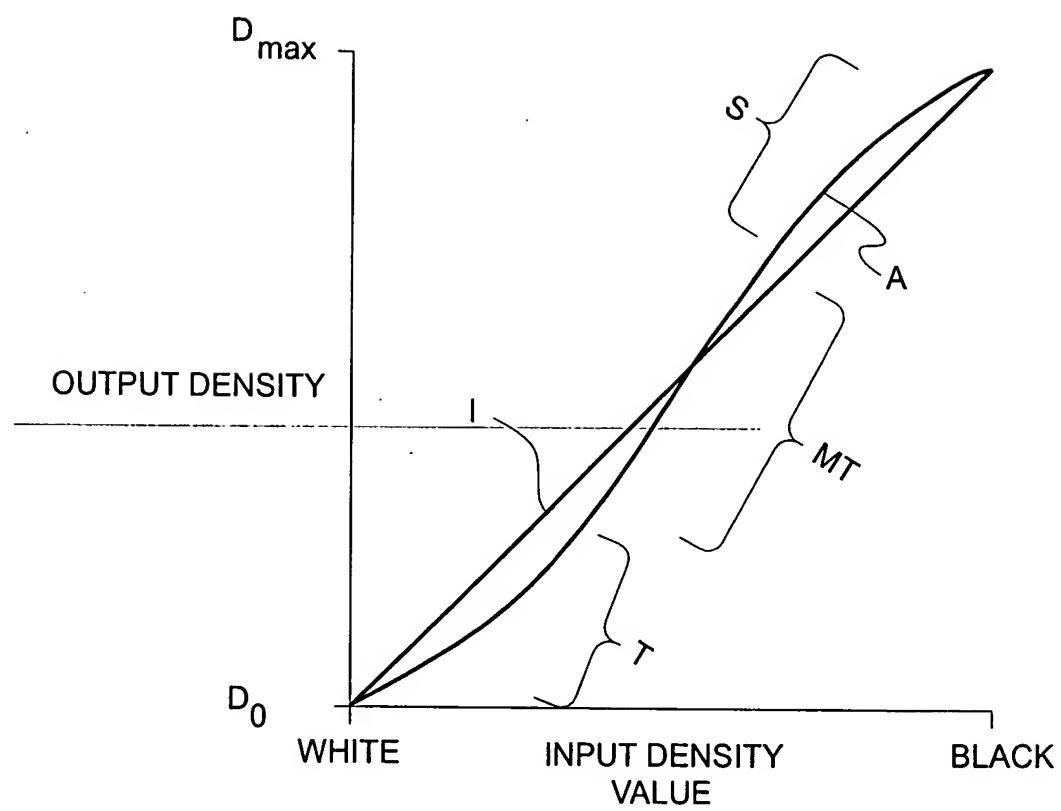


FIG. 11

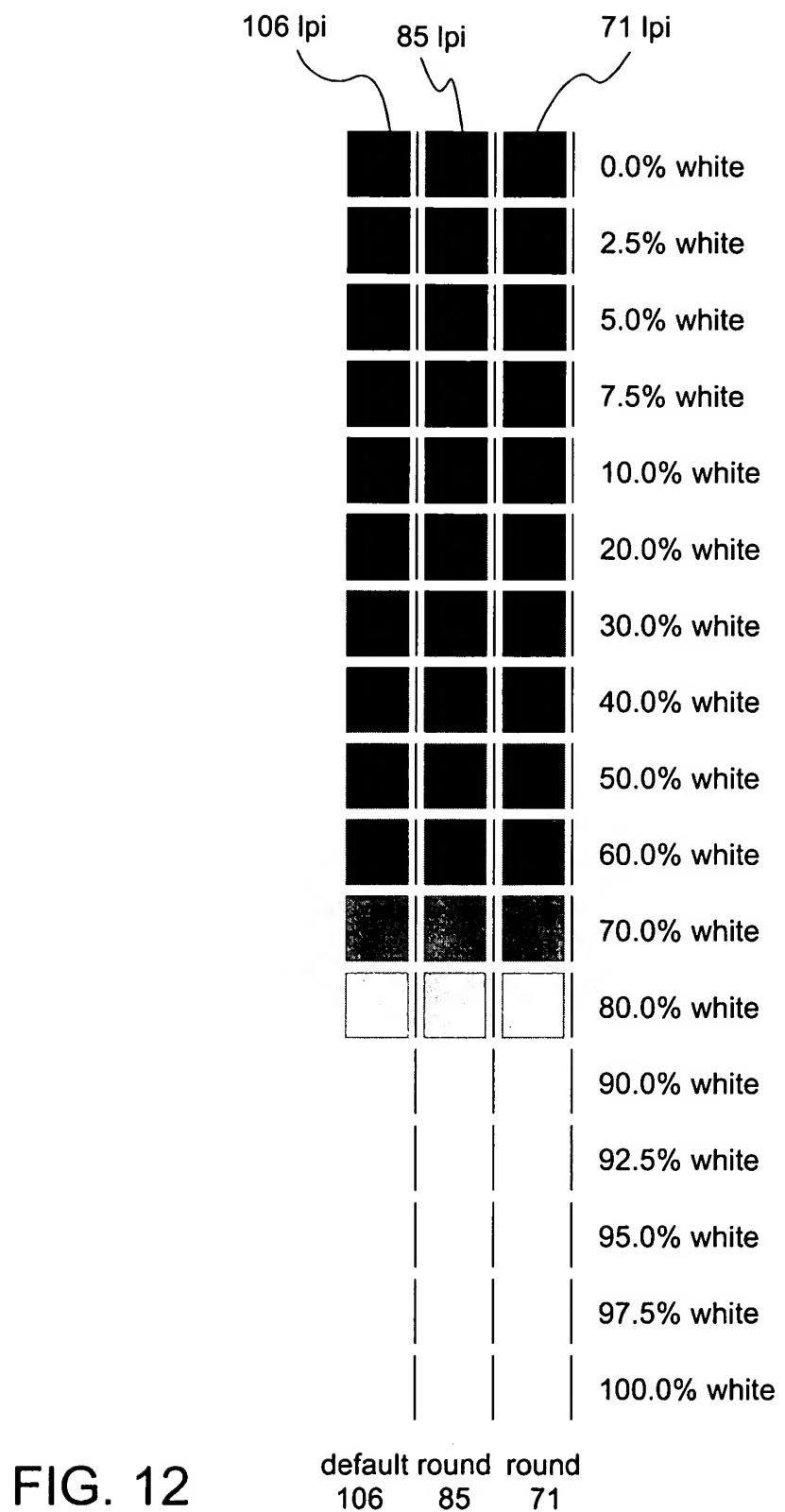


FIG. 12

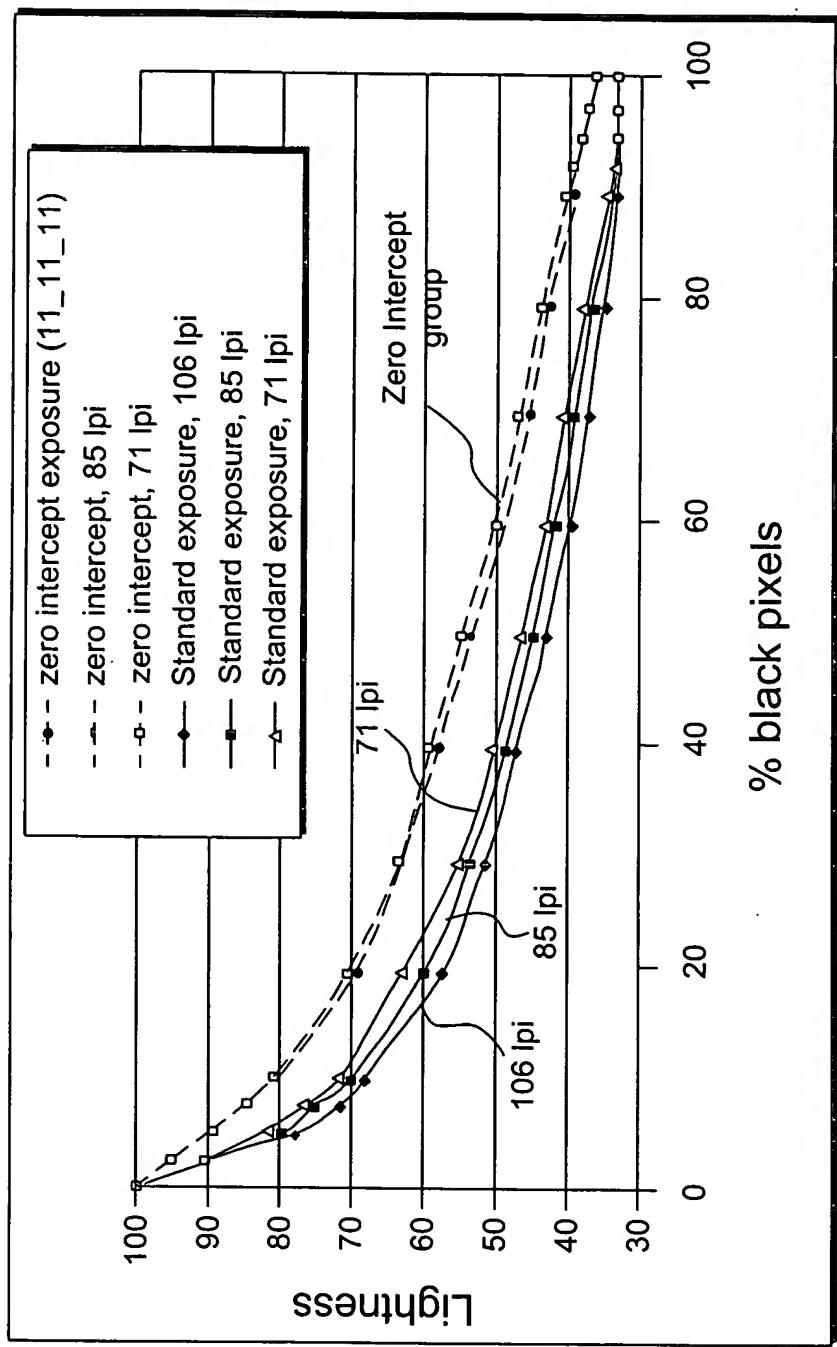


FIG. 13

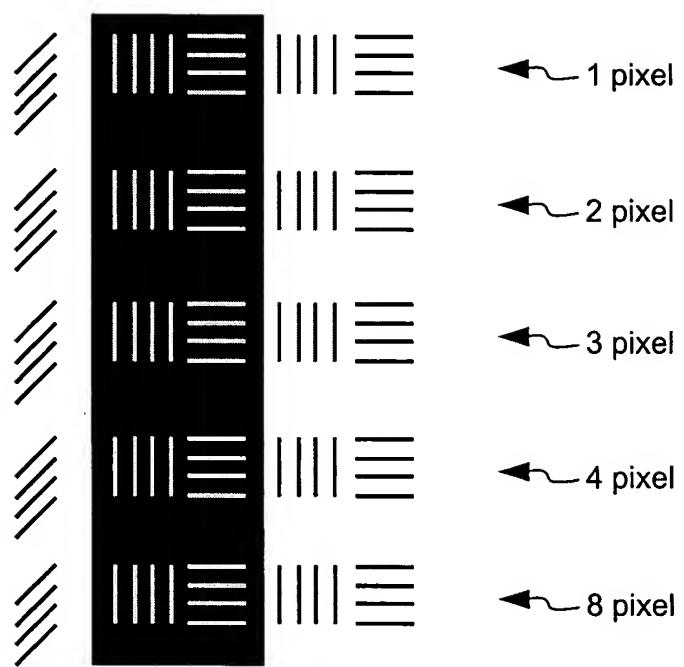


FIG. 14

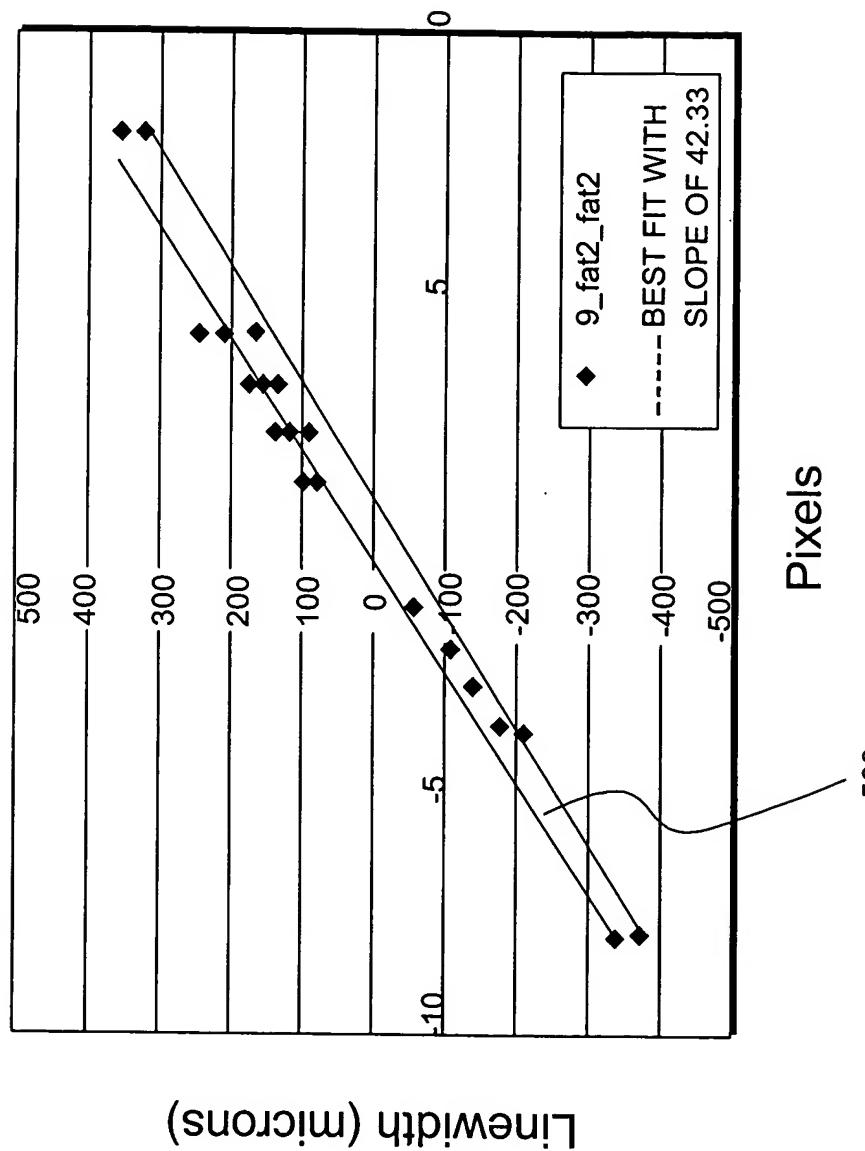


FIG. 15

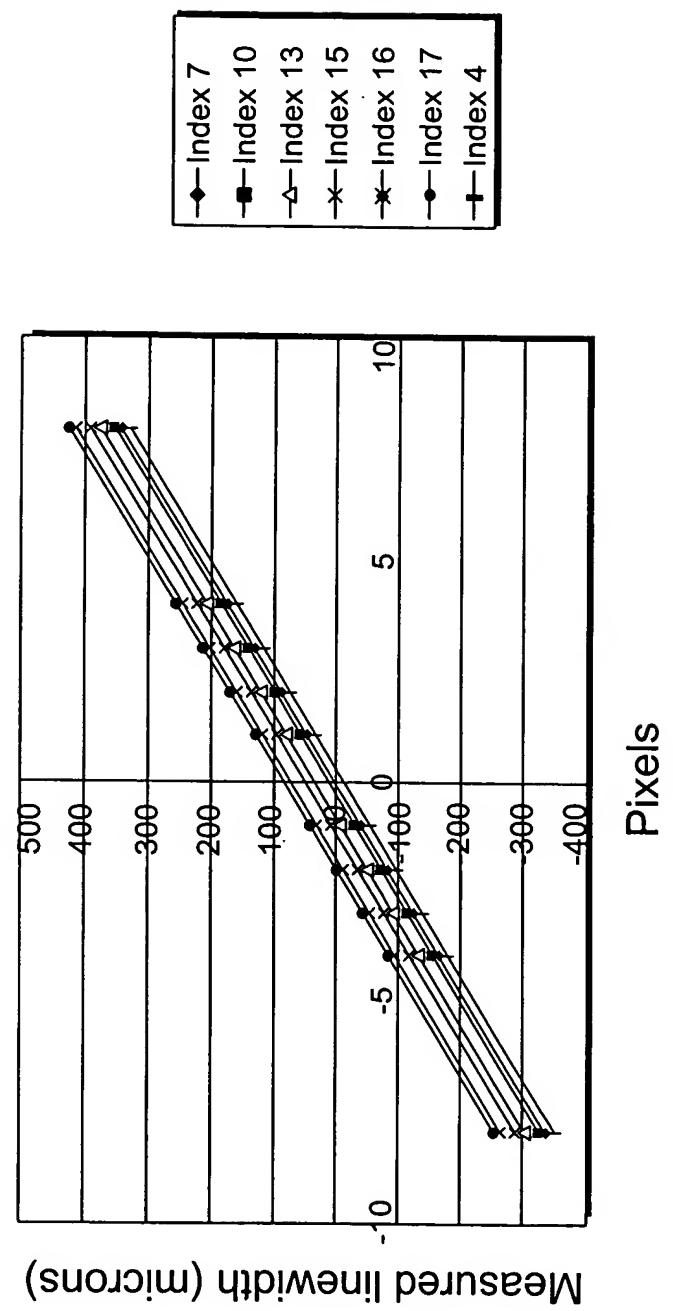


FIG. 16

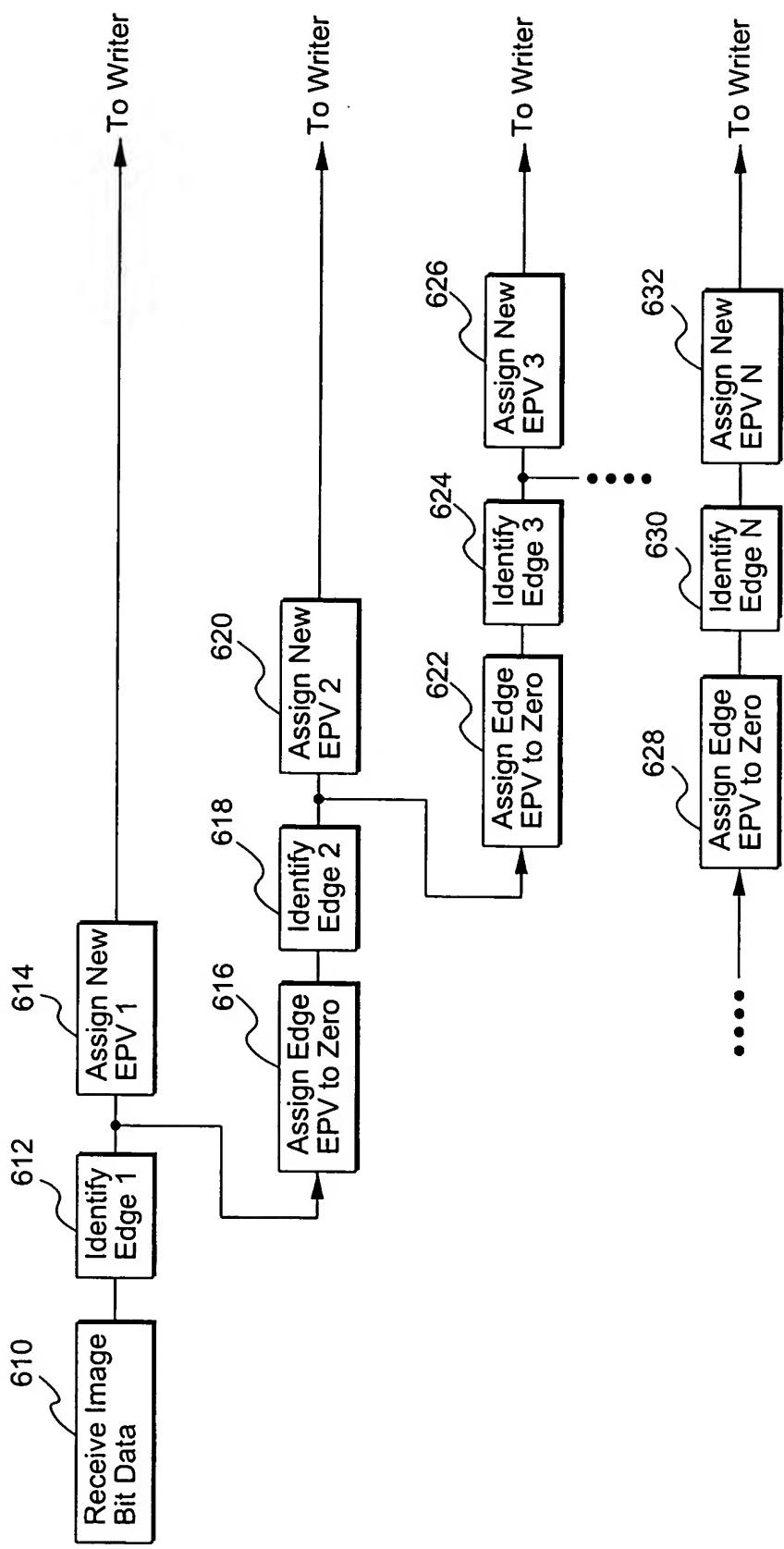


FIG. 17

b7	b6	b5
b4	PIQ	b3
b2	b1	b0

FIG. 18a

FIG. 18b $\underline{b_7} \underline{b_6} \underline{b_5} \underline{b_4} \underline{b_3} \underline{b_2} \underline{b_1} \underline{b_0}$

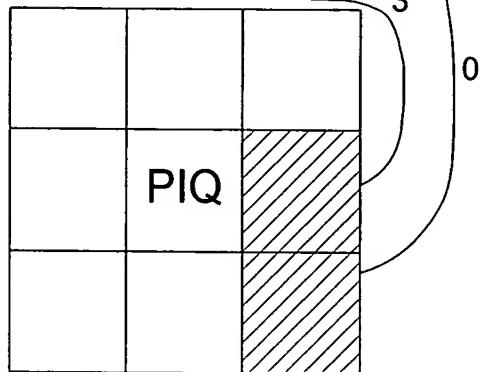
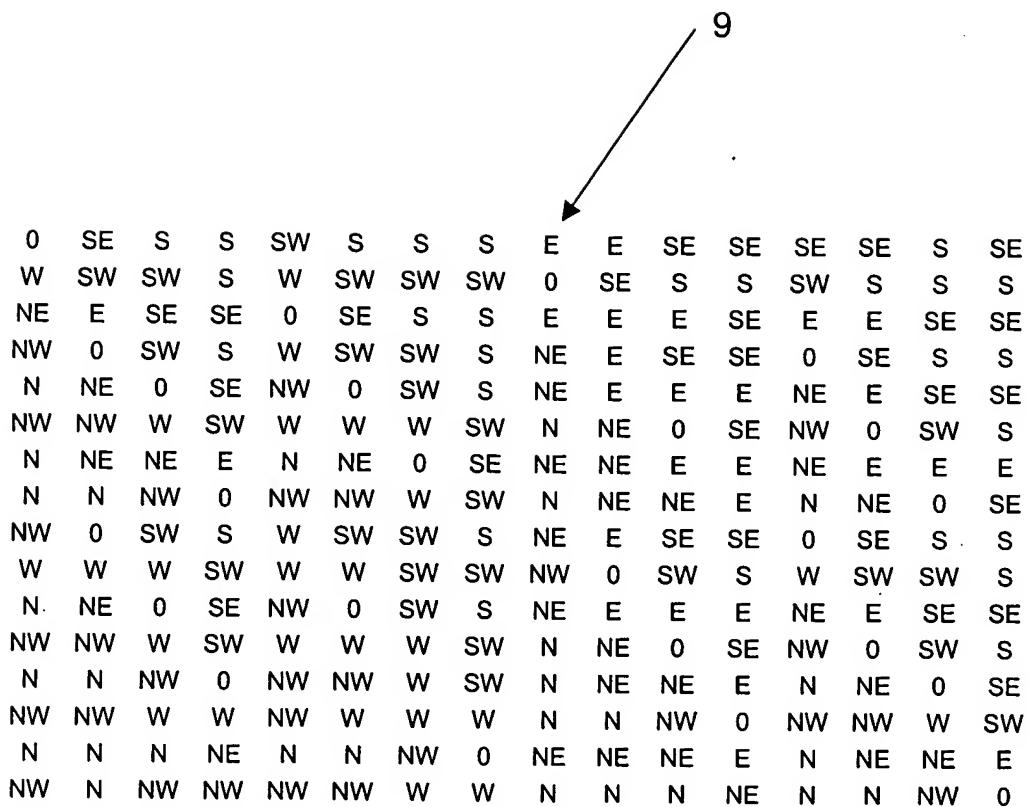


FIG. 18c

00001001

Fig. 18d



A 17x17 grid of characters representing directions. The characters are: 0, SE, S, S, SW, S, S, S, E, E, SE, SE, SE, SE, S, SE. The grid is labeled with a diagonal arrow pointing to the character '9' in the 10th row and 10th column.

0	SE	S	S	SW	S	S	S	E	E	SE	SE	SE	SE	S	SE
W	SW	SW	S	W	SW	SW	SW	0	SE	S	S	SW	S	S	S
NE	E	SE	SE	0	SE	S	S	E	E	E	SE	E	E	SE	SE
NW	0	SW	S	W	SW	SW	S	NE	E	SE	SE	0	SE	S	S
N	NE	0	SE	NW	0	SW	S	NE	E	E	E	NE	E	SE	SE
NW	NW	W	SW	W	W	W	SW	N	NE	0	SE	NW	0	SW	S
N	NE	NE	E	N	NE	0	SE	NE	NE	E	E	NE	E	E	E
N	N	NW	0	NW	NW	W	SW	N	NE	NE	E	N	NE	0	SE
NW	0	SW	S	W	SW	SW	S	NE	E	SE	SE	0	SE	S	S
W	W	W	SW	W	W	SW	SW	NW	0	SW	S	W	SW	SW	S
N	NE	0	SE	NW	0	SW	S	NE	E	E	E	NE	E	SE	SE
NW	NW	W	SW	W	W	W	SW	N	NE	0	SE	NW	0	SW	S
N	N	NW	0	NW	NW	W	SW	N	NE	NE	E	N	NE	0	SE
NW	NW	W	W	NW	W	W	W	N	N	NW	0	NW	NW	W	SW
N	N	N	NE	N	N	NW	0	NE	NE	NE	E	N	NE	NE	E
NW	N	NW	NW	NW	NW	W	W	N	N	N	NE	N	N	NW	0